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Collective dynamics in liquid aluminum near the melting temperature: Theory and computer simulation

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Abstract

The microscopic collective dynamics of liquid aluminum near the melting temperature has been studied using two independent methods: first, using a theoretical approach developed in terms of the Zwanzig-Mori formalism and based on Bogolyubov's idea of reduced description of relaxation processes in liquids; second, using molecular dynamics simulation. The X-ray inelastic scattering spectra obtained with the theoretical approach and computer simulation are compared with experimental data. The high-frequency acoustic excitations that appear on microscopic spatial scales in liquid aluminum are found to be mainly caused by two-, three-, and four-particle interactions. © Nauka/Interperiodica 2006.

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